

# pneumothorax

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# Definition

- Pneumothorax is defined as the presence of air in the pleural space, which can either occur spontaneously, or result from iatrogenic injury or trauma to the lung or chest wall.

# Mechanism and types

- ❖ Spontaneous
  - Primary
  - Secondary
- ❖ Traumatic

# Spontaneous Pneumothorax

## ❖ Spontaneous pneumothorax

- Pneumothorax with no obvious cause

## ❑ Primary spontaneous pneumothorax

- Occurs with no underlying lung disease
- Most (80%) have small subpleural blebs
- Typically happens in tall, thin, young adults
- >90% have had short-term smoking history
- Smoking cessation recommended

## ❑ Secondary spontaneous pneumothorax

- Occurs with underlying lung disease
- Most common associated disease is COPD
- Also seen during exacerbations of asthma and CF
- Interstitial lung diseases with normal lung volumes
- Sarcoidosis, BOOP
- Depending on extent of disease, pneumothorax can be devastating
- 43% 5-year mortality

# Traumatic pneumothorax

## □ Penetrating chest trauma

- Common secondary to bullet or knife penetration
- Chest tube is usually adequate to treat.
- May require surgery if bleeding is severe

## □ Blunt trauma

- Broken ribs puncture lung with air escape into pleura.
- Chest tube is all that is generally required
- Tracheal fracture and esophageal rupture
- These are two special causes require surgical repair

# Traumatic pneumothorax

## ❑ Iatrogenic

- Most common cause of traumatic pneumothorax
- Common iatrogenic causes are
  - Needle aspiration lung biopsy
  - Thoracentesis
  - Central venous catheter placement
  - following thoracic surgery

# Types of spontaneous pneumothorax

## ❖ Closed Pneumothorax

Where the communication between the airway and the pleural space seals off as the lung deflates and does not re-open, the mean pleural pressure remains negative spontaneous reabsorption of air and re-expansion of the lung occur over a few days or weeks, and infection is uncommon.

## ❖ Open pneumothorax

the communication fails to seal and air continues to pass freely between the bronchial tree and pleural space . An example of the latter is a bronchopleural fistula, which can facilitate the transmission of infection from the airways into the pleural space, leading to empyema.



# Types of spontaneous pneumothorax

- An open pneumothorax is commonly seen following rupture of an emphysematous bulla, tuberculous cavity or lung abscess into the pleural space

# Tension pneumothorax.

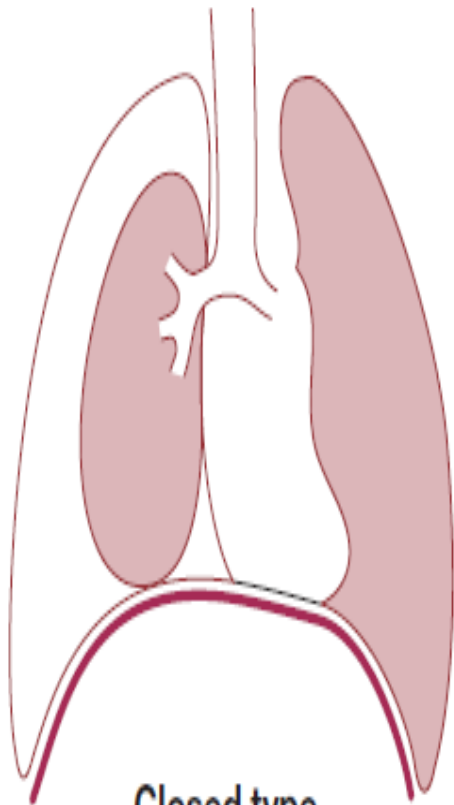
- These are an emergency condition
- the communication between the airway and the pleural space acts as a one-way valve, allowing air to enter the pleural space during inspiration but not to escape on expiration.

Large amounts of trapped air accumulate progressively in the pleural space and the intrapleural pressure rises to well above atmospheric levels.

- This causes mediastinal displacement towards the opposite side, with compression of the opposite normal lung and impairment of systemic venous return, causing cardiovascular compromise

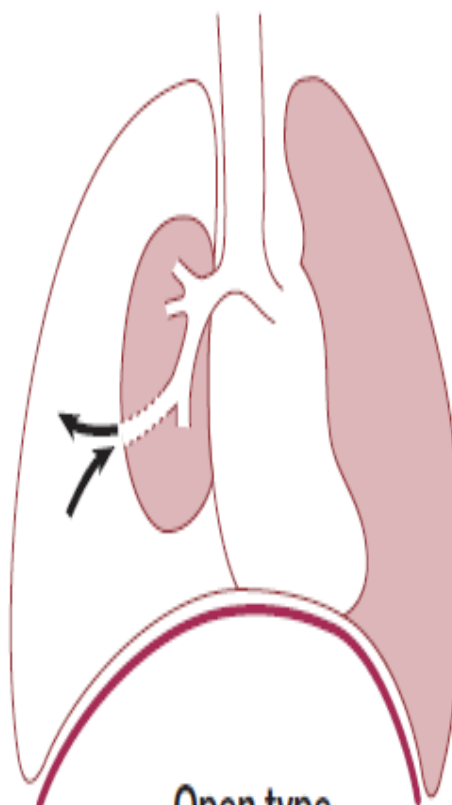
# Types of spontaneous pneumothorax

A



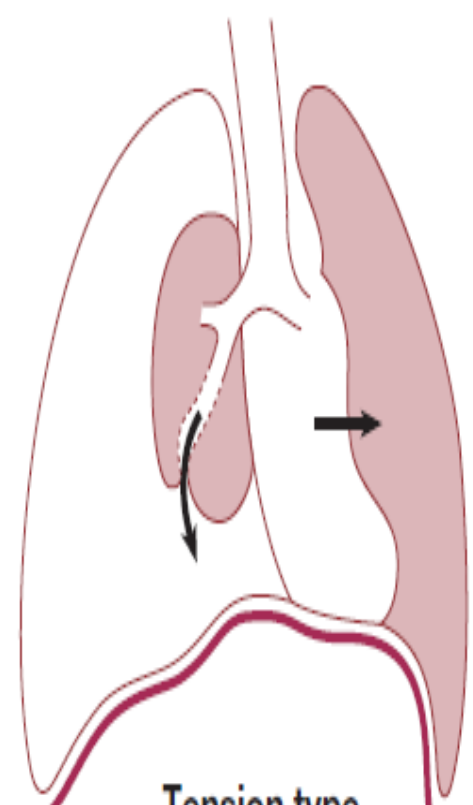
**Closed type**  
Mean pleural pressure  
negative

B



**Open type**  
Mean pleural pressure  
atmospheric

C



**Tension type**  
Mean pleural pressure  
positive, mediastinal shift  
to opposite side

# ***Clinical features***

- The most common symptoms are sudden-onset unilateral pleuritic chest pain or breathlessness.
- In those individuals with underlying lung disease, breathlessness can be severe and may not resolve spontaneously
- cough may present

# Physical examination

## ❖ Inspection

- Tachypnoea (pain, deflation reflex)
- Elevation of ipsilateral side

## ❖ Palpation

- ↓ Expansion ipsilateral side

## ❖ Percussion

- Resonant or hyper-resonant ipsilateral side

## ❖ Auscultation

- Absent breath sounds on ipsilateral side
- The combination of absent breath sounds and a hyper resonant percussion note is diagnostic of pneumothorax.

# Tension pneumothorax

- In tension pneumothorax there is rapidly progressive breathlessness associated with a marked tachycardia, hypotension, cyanosis and tracheal displacement away from the side of the silent hemithorax.

Occasionally, tension pneumothorax may occur without mediastinal shift, if malignant disease or scarring has splinted the mediastinum.

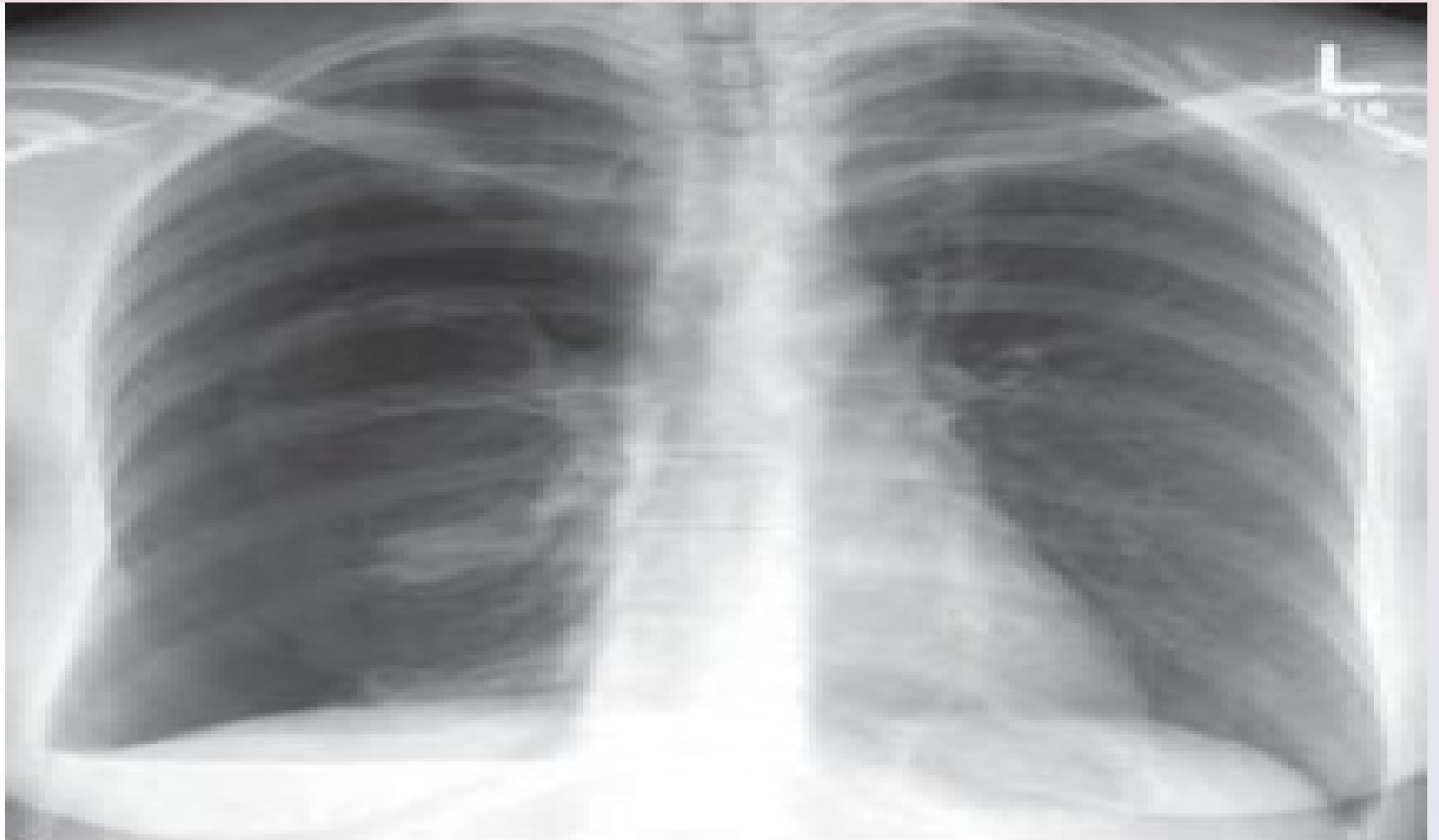
# Investigations

## ❖ The chest X-ray

- shows the sharply defined edge of the deflated lung with complete translucency (no lung markings) between this and the chest.
- X-rays may also show the extent of any mediastinal displacement and reveal any pleural fluid or underlying pulmonary disease. In ICU, 30% of pneumothoraces are missed due to: Low-quality film Supine position of patient on AP film Air hidden behind thoracic or mediastinal structures

## ❖ Chest CT scan

is used in difficult cases to avoid misdirected attempts at aspiration.





# ***Management***

- **Primary pneumothorax**
- May normally resolves without intervention
- If lung edge is less than 2 cm from the chest wall (Pneumothorax <15% of hemithorax) and the patient is not breathless then Observe patient for 6 hours and Outpatient follow-up
- with a moderate or large spontaneous primary pneumothorax or significant dyspnoea
  - ✓ percutaneous needle aspiration if young **or**
  - ✓ intercostal tube drainage if > 50 years of age **or** > 2.5 L air
- aspirated **or** pneumothorax persists

# ***Management***

## Secondary pneumothorax

- In these individuals, the success rate of aspiration is much lower, and intercostal tube drainage and inpatient observation are usually required particularly in those over 50 years old and those with respiratory compromise.
- Other treatment
- Supplemental oxygen may speed resolution, as it accelerates the rate at which nitrogen is reabsorbed by the pleura.
- **surgery**. Continued bubbling after 5–7 days is an indication for surgery.

# ***Management***

- Tension pneumothorax
- If there is a tension pneumothorax, immediate release of the positive pressure by insertion of a blunt cannula into the pleural space may be beneficial, allowing time to prepare for chest drain insertion.
- ADVICES
- Avoid smoking
- Avoid air traveling for 2wks of full inflation prior to travel
- Avoid diving
- Recurrent spontaneous pneumothorax
- Surgical pleurodesis is recommended

Thank you